CLAIMS

1. A fusion receptor composition having the structure:

PSMA-scFv : optional connector : cytoplasmic domain,

wherein PSMA-scFv represents a single chain antibody cloned from the V region genes of a hybridoma specific for prostate-specific membrane antigen, the cytoplasmic domain is the cytoplasmic domain of a molecule which functions as a transducer of a mammalian immune response in the presence of a costimulatory factor, and the connector is a region of one or more amino acids disposed between the PSMA-scFv and the cytoplasmic domain, said connector to be of sufficient length to allow both the PSMA-scFv and the cytoplasmic domain to retain function, whereby the fusion receptor is effective when expressed in a T-cell to promote a cellular immune response to prostate-specific membrane antigen.

2. The fusion receptor of claim 1, wherein the cytoplasmic domain comprises a ζ-chain of CD3.

3. The fusion receptor of claim 1, wherein the cytoplasmic domain is derived from CD28.

4. The fusion receptor of claim 3, wherein the cytoplasmic domain is a portion of CD28 cDNA spanning amino acids 336-663.

5. The fusion receptor of claim 1, wherein the cytoplasmic domain is derived from 41-BB.

6. The fusion receptor of ~~any of~~ claims 1 ~~to 5~~, wherein the connector is a CD8 hinge.

7. A method for treating a patient suffering from cancer, wherein the cells of the cancer or neovasculature associated with the cancer express prostate-specific membrane antigen, comprising the steps of:

(a) preparing an expression vector comprising an expressible polynucleotide molecule encoding a fusion protein in accordance with ~~any of~~ claims 1 ~~to 5~~;

(b) transducing the expression vector into peripheral blood lymphocytes obtained from the patient to obtain transduced lymphocytes expressing the fusion protein; and

(c) reintroducing the transduced lymphocytes into the patient, whereby said transduced lymphocytes respond to antigen on the surface of the cells of the cancer to generate a cytolytic immune response to the cells of the cancer.

8. The method of claim 7, wherein the expression vector is transduced into the peripheral blood lymphocytes in an *ex vivo* process.

9. The method of claim 7, wherein the expression vector is an SFG vector.

10. The method of claim 9, wherein the expression vector is transduced into patient PBL using gibbon ape leukemia virus envelope-pseudotyped virions.

11. The method of claim 8, wherein the expression vector is transduced into patient PBL using gibbon ape leukemia virus envelope-pseudotyped virions.

12. Peripheral blood lymphocytes transduced with and expressing a fusion receptor in accordance with ~~any of~~ claims 1 ~~to 5~~.

13. An expression vector comprising a polynucleotide sequence encoding a fusion receptor in accordance with ~~any of~~ claims 1 ~~to 5~~ and control sequences effective to promote expression of the fusion receptor in mammalian lymphocytes.

14. The vector of claim13, wherein the expression vector is an SFG vector.

15. The vector of claim 14, wherein the expression vector is packaged in gibbon ape leukemia virus envelope-pseudotyped virions.

16. The vector of claim 13, wherein the expression vector is packaged in gibbon ape leukemia virus envelope-pseudotyped virions.

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